REMARKS

The application has been reviewed in light of the Office Action dated August 12, 2003. Claims 1-72 were pending.

The Office Action states that claims 3, 5, 7, 9, 11, 13, 15-19, 32, 34, 36, 43, 45, 47, 49, 51, 53, 55 and 57 are allowed, and claims 14, 24-26, 38, 39, 54, 63-65, 71 and 72 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form. By this Amendment, Applicants have amended claims 14, 24, 25, 38, 39, 54, 63, 64, 71 and 72, into independent form, including all of the limitations of the base claim and any intervening claims. Claims 26 and 65 depend from claims 25 and 64, respectively, and are therefore believed to be allowable for at least the same reasons that claims 25 and 64, as amended into independent form, are deemed to be allowable.

In addition, Applicants have amended claims 1, 2, 10, 31, 37, 40-42, 50 and 58 to clarify the claimed invention, and added new claim 73. Support for the claim amendments may be found in the application, inter alia, in FIGS. 2, 6, 8A-8B, 10, 13, 18, 23A-23B and 29. Applicants respectfully submit that no new matter is introduced by the claim amendments, and request entry of this Amendment.

Accordingly, claims 1-73 are now pending, and claims 1, 2, 4, 6, 8, 10, 12, 20-23, 27-31, 33, 35, 37, 40-42, 44, 46, 48, 50, 52, 56, 58-62, 66-70 and 73 are presented for examination, with claims 1, 2, 8, 10, 31, 37, 40-42, 48-50 and 58 being in independent form.

Claims 1, 2, 10, 12, 20-23, 27, 28, 30, 31, 33, 35, 37, 40-42, 50, 52, 56, 58-62, 66, 67, 69 and 70 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over U.S. Patent No. 6,179,419 to Rasmussen et al. in view of U.S. Patent No. 5,121,170 to Bannai et al.

Claims 4, 6, 44 and 46 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Rasmussen in view of Bannai and further in view of Japanese Patent Application No. 10264047 (Munakata). Claims 8, 29, 48 and 68 were rejected under 35 U.S.C. §103(a) as purportedly unpatentable over Rasmussen in view of Bannai and U.S. Patent No. 5,530,535 to Matsuoka.

Applicants have carefully considered the Examiner's comments and the cited art, and respectfully submit that independent claims 1, 2, 8, 10, 31, 37, 40-42, 48-50 and 58 are patentable over the cited art, for at least the following reasons.

This application relates to improvements to techniques for conveying a recording medium to an image recording part of, for example, an inkjet recording device, so as to increase positional precision of applying liquid (such as ink) onto the recording medium to form consistently a high-quality image on the recording medium. A conveying belt may be used to convey the recording medium, and the conveying belt may be uniformly charged positively such that an electrostatic force causes the recording medium to stick fast to the conveying belt and displacement of the recording medium can be avoided. On the other hand, ink drops jetted from a recording head of the inkjet recording device are affected by an electric field and the landing spots of the ink drops may be displaced on the recording sheet. In order to avoid the displacement of the landing spots of the ink drops, a negative charge is applied to the conveying belt so as to lessen the electrostatic force in the vicinity of the recording head. According to the present application, a positive charge and a negative charge are alternately applied by a belt charging unit in a moving direction of the conveying belt.

In addition, a first length of a path along which the recording medium travels after being separated by a separating unit and until the recording medium contacts the conveying belt is greater than a second length along the conveying belt from a position of the belt charging unit to a position at which the recording medium contacts the conveying belt. According to this feature, a charge can be surely formed on a part of the conveying belt which contacts the recording medium when a feeding operation of the recording medium and the charging operation of the charging unit are started at the same time. If the first length is smaller than the second length, there is formed an uncharged part on the conveying belt in a position corresponding to a leading end of the recording medium. Additionally, if the same time start is not performed, that is, in a case in which the feeding operation of the recording medium is started after starting the charging operation of the charging unit so as to start the formation of a charged part before the feeding operation of the recording medium is started, the above-mentioned problem may be eliminated but the number of recording media fed for a unit time (for example, paper per minutes) is decreased, which reduces a total printing speed.

Claim 1 is directed to a recording-medium conveying device conveying a recording medium to an image recording part, the recording medium being separated and fed from a recording-medium feeding device. The recording-medium conveying device comprises a conveying belt and a belt charging unit. The conveying belt is wound around a driving roller and a driven roller so as to convey the recording medium to the image recording part. The conveying belt has an insulating layer formed at at least a side contacting the recording medium. The belt charging unit is provided in contact with the conveying belt and in a

vicinity of a separating unit so as to charge the conveying belt with a positive charge and a negative charge alternately in a moving direction of the conveying belt by applying an AC bias to the conveying belt. A first length of a path along which the recording medium travels after being separated by the separating unit and until the recording medium contacts the conveying belt is greater than a second length along the conveying belt from a position of the belt charging unit to a position at which the recording medium contacts the conveying belt.

The cited art does not disclose or suggest the claimed invention.

Rasmussen, as understood by Applicants, is directed to use of closed loop feedback control for achieving improved media advance accuracy in a media handling system having an endless loop belt. A position of a drive shaft which rotates the endless belt or a position of the endless belt is monitored to provide feedback to a drive motor.

The Office Action acknowledges that Rasmussen does not disclose, however, a belt charging system or a sheet separating unit.

Bannai, as understood by Applicants, is directed to a device for use in electrostatic image recording equipment for retaining and transporting a paper sheet or document via an endless belt. An AC voltage is applied to the belt to form a charge density pattern on the surface of the belt, while the charge density pattern sets up a non-uniform electric field in close proximity to the surface of the belt. The non-uniform electric field urges the sheet against the belt and thereby allows the sheet to be transported by the belt with little or no displacement.

Munakata, as understood by Applicants, is directed to techniques for limiting fluctuation in the amounts of color shifts in an image forming device even if ambient temperature varies. Munakata is cited

in the Office Action for its disclosure of providing urethane on the driving roller.

Matsuoka, as understood by Applicants, is directed to a sheet-conveying device in which a rotatable pressing member is provided to press a rotating roller so that a sheet is held and conveyed between the pressing members. Matsuoka is cited in the Office Action as disclosing providing projections on a driving roller and a driven roller which mate with perforations on the belt.

Applicants find no teaching or suggestion in the cited art, however, that a first length of a path along which the recording medium travels after being separated by the separating unit and until the recording medium contacts the conveying belt is greater than a second length along the conveying belt from a position of the belt charging unit to a position at which the recording medium contacts the conveying belt, as provide by the claimed invention recited in amended claim 1. Since the cited art does not disclose or suggest each and every feature of the claimed invention, the cited art does not render the claimed invention unpatentable.

Independent claims 2, 8, 10, 31, 37, 40-42, 48-50 and 58 are patentably distinct from the cited art for at least similar reasons.

Accordingly, for at least the above-stated reasons, Applicants respectfully submit that independent claims 1, 2, 8, 10, 31, 37, 40-42, 48-50 and 58, and the claims depending therefrom, are patentable over the cited art.

According to new claim 73, a belt charging unit is provided in the vicinity of the driving roller. Since a charge roller is pressed onto the conveying belt in the vicinity of the drive roller, the conveying belt is pressed against the drive roller, which prevents

slippage of the conveying belt roller relative to the driving roller. This feature allows a travel of a recording medium in a sub scanning direction in a printing system (such as an inkjet printing system) to be controlled with high accuracy. Even if the recording paper is firmly fixed onto the conveying belt by charging the conveying belt, the positional accuracy of the recording paper cannot be maintained well if the conveying belt moves relative to the driving roller (such as in conventional systems). Additionally, if the conveying belt is pressed by the charge roller at a position remote from the driving roller by the charge roller, the conveying belt may be bowed, which also deteriorate the positional accuracy of the recording medium fixed onto the conveying belt.

Bannai and the other cited art do not disclose a belt charging unit provided in the vicinity of the driving roller. Independent claim 73 is believed to be patentable over the cited art.

The Office is hereby authorized to charge the additional claims fees and any additional fees that may be required in connection with this amendment, and to credit any overpayment, to our Deposit Account No. 03-3125.

If a petition for an extension of time is required to make this response timely, this paper should be considered to be such a petition, and the Commissioner is authorized to charge the requisite fees to our Deposit Account No. 03-3125.

If a telephone interview could advance the prosecution of this application, the Examiner is respectfully requested to call the undersigned attorney.

Reconsideration and allowance of this application are respectfully requested.

Respectfully submitted,

Paul Teng, Reg. No. 40,837
Attorney for Applicants
Cooper & Dunham LLP
Tel.: (212) 278-0400